

ABSTRACT OF THE DISCLOSURE

The present invention is an improved a combustor incorporating a pre-mix/pre-evaporation chamber arranged and configured to produce both a cool portion and a hot portion that cooperate to vaporize a liquid fuel to produce a lean to low-rich combustion mixture that is ejected from chamber into the combustor where is then ignited to produce a stable non-sooting flame maintained substantially within a combustion zone that yields a clean hot exhaust stream for heating downstream process components or processes such as one or more components of an autothermal reformer (ATR).